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I. BATHYMETRIC PROFILE

A. Overview

To map the seabed, we need to have different kind of information. The location of the measurement point and the depth at this point. To do that, we use different kind of equipment. One, to find the position, is a Trisponder. The other one, to find the depth is an Echotrac. The first one works with some beacons and gives the two distances of the point to the two beacons. Then we are able to compute the position and have our absolute position. The Echotrac, gives the depth at the same time, it prints it on a paper, to check it.

For the bathymetric profiling, as we work on shallow waters, we need to install this equipment on small boats, with its own power. The difficulty is to check the accuracy of the data, and then to be able to print it when you are on the field survey into a map form.

The default survey for a bathymetric profile is divided into lines, where the boat keeps a heading. During these lines the data from the apparatus is stored in the computer. The choice of the lines gives a usable grid ready for post-processing and contouring.

B. Logging

The software, called ZEDLOG, is used to log parameters in real time on the field. It replaces previous versions. Until now, the automatic logging of the navigation and bathymetry has been realised by using two laptop, each of them connected to one apparatus.

The new, faster computers allow to do the two operations on only one machine. Therefore the existing logging software has been completely rewritten to take advantage of this. As the computer changes the sounding system also. The software gives examples of possible development of new type of control of the equipment.

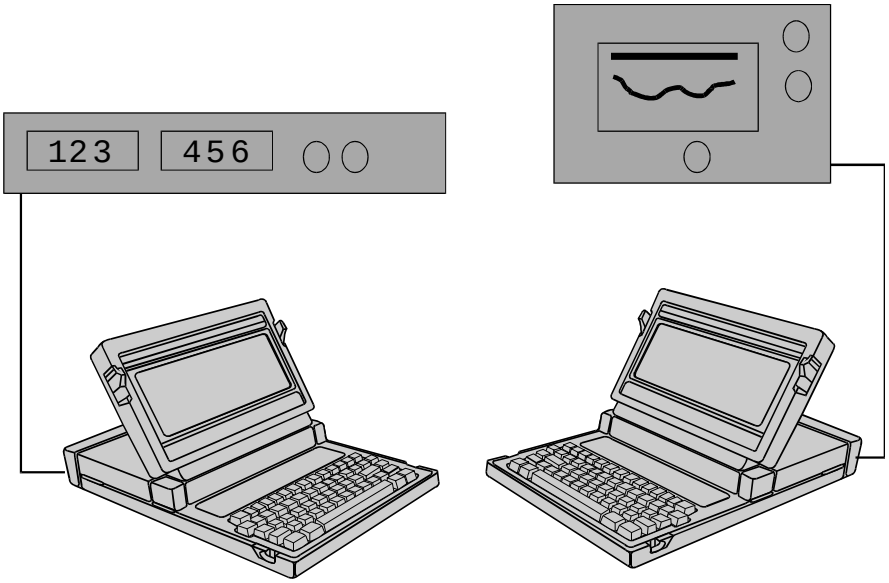
Due to the lack of available time to fully develop a completely new product, the compatibility with the previous software has been kept as much as possible. In particular, the output format which means that the software still generates two different files, one for each type of data, XY, and Z.

C. Past Situation

Before this new improvement, all the logging were recorded on two different computers, which were synchronised manually by setting the same clock time.

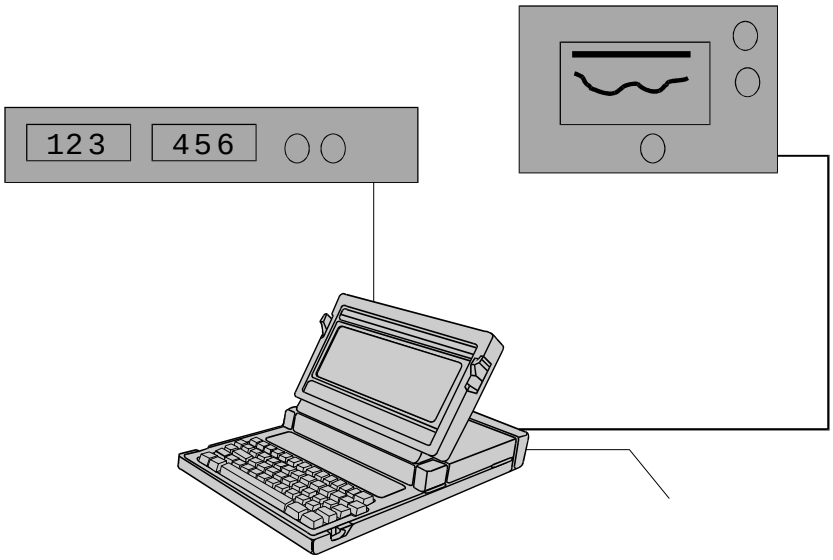
One post processing software was able to recompose the sounding point by searching in one file the xy position and in the second file the z(depth) position. The cross reference field was the time.

Due to the old computers and the least performance of the previous language, the recording were made only every seconds. A mark was added on the screen of the Echotrac to create a paper reference point. This mark was remotely created by the parallel port of the computer which was recording the z value.



D. New Situation

Now the logging is made by only one computer, this computer can also close a TTL link to remote a mark system on an external system such as the EPC sounder. The new mark system is directly made through the serial port and display more information on the paper than the previous one.



II. PRINCIPAL OF OPERATION

A. Hardware and System Requirements

Any IBM compatible machine with an 80386 processor or higher

A Hard disk with a least 1MB free space for 1 hour logging (common value).

A VGA or compatible Display.

4 MB of memory.

A Windows pointing device.

Microsoft MS-DOS version 3.1 or later.

Microsoft Windows version 3.1 in standard or enhanced mode.

2 Serial ports.

The Odom Echotrac DF3200 or compatible.

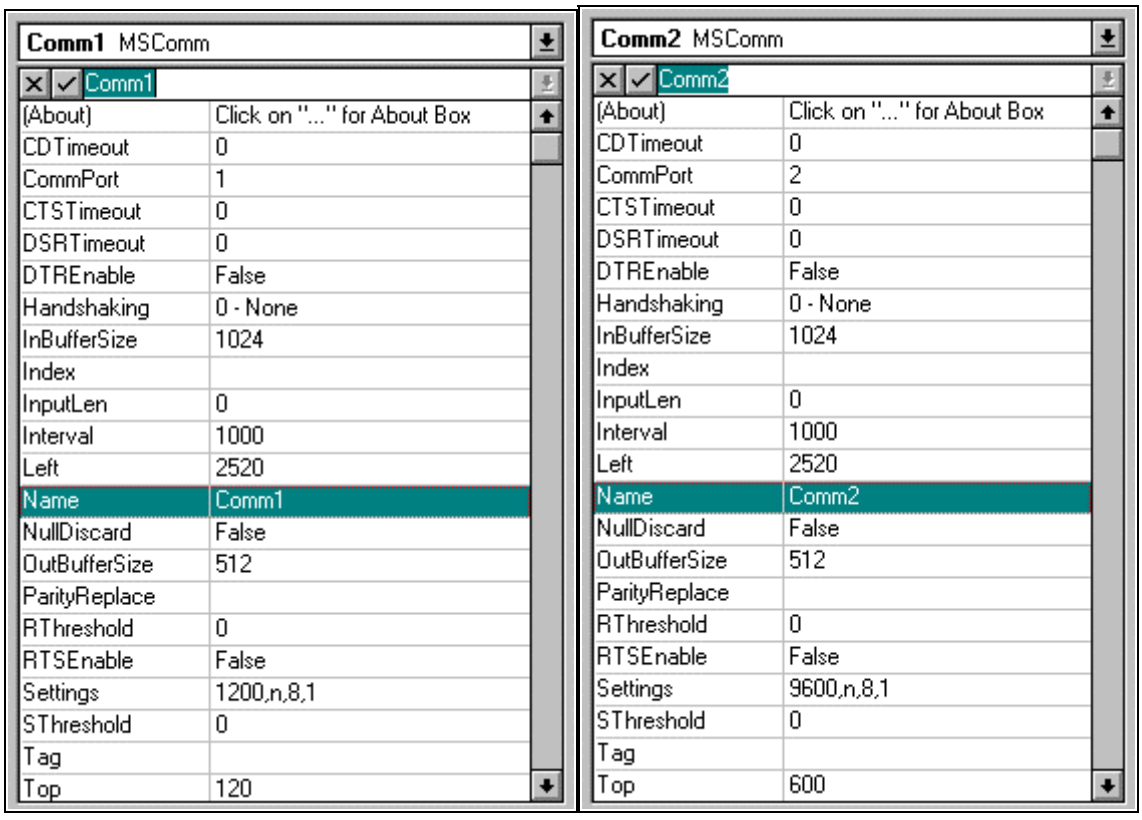
A special serial cable for the Echotrac.

The Del Norte Technology Trisponder Model 520 or compatible.

B. Visual Basic vs. BASIC

The software has been developed using Visual Basic language. The principal can be different from standard basic. It handles objects placed on forms. Each object has a piece of code, in close to standard BASIC, which describes the series of operations to realise. For instance, there are buttons, each related to an action.

The data arrive on the two serial ports. Objects on the form describe the setting of the each serial port.



XY **Z**

C. Installing the System

1. Connections

For the set-up, of both the Trisponder and the Echotrac, please refer to their manuals.

The Trisponder must be connected to the laptop via the serial port called Com1, or port A.

The Echotrac must be connected to the laptop via the serial port called Com2, or port B.

An extra connection is provided via the Echotrac serial cable. This connection must be plug to a TTL mark system. IN ANYWAY YOU SHOULD PLUG THIS MARK SYSTEM ON TO THE ECHOTRAC MARK SYSTEM.

2. Start Zedlog Software

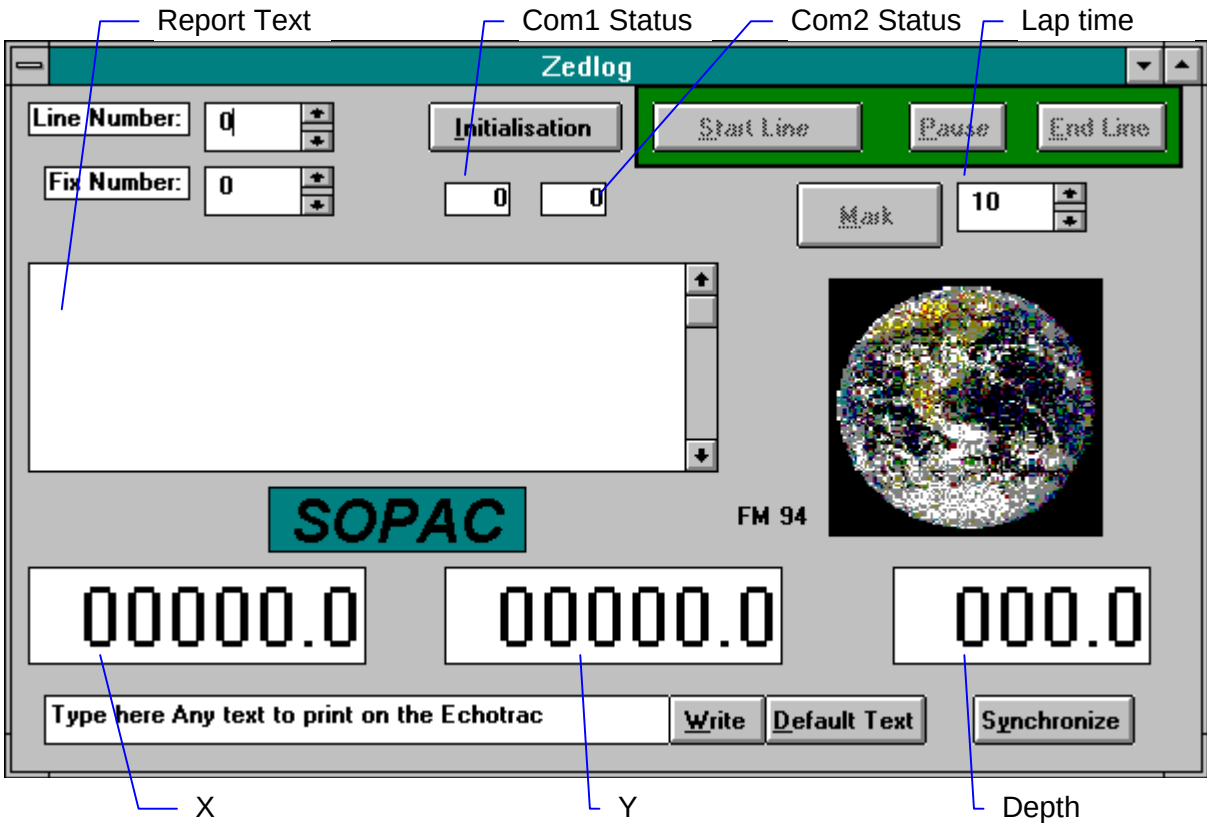
ZEDLOG

In the Program Manager just double click on this icon.

a) Important Warning
As windows is not a real multitasking Operating System, nor a real time OS, Zedlog could be slowed down or worst halted by other applications. Therefore in anyway, to keep the accuracy of the data, you must have the minimum application running at the same time on windows. Program Manager and the Clock are the only applications recommended to run with Zedlog. Also when the data acquisition starts, it is highly recommended to not touch any window.

D. Running the System

1. Screen Description



a) Initialisation
Click here to open a File Save As dialog box, where you will enter the name of the file where the data will be saved (In fact two file are created, the first one with the extension .xay for the data from the Trisponder, the second with the extension .zat for the data from the Echotrac). This Initialisation button is required to enable the data acquisition.

b) Line Number
Set here the Line Number of your beach profile. The limit value are 0 to 999.

c) Fix Number
Set here the first Fix Number of your Line. The limit values are 0 to 9999.

d) Start Line.
Click on this button to start the data acquisition for the Line specified in Line Number. The Initialisation should have been set-up.

e) Pause
Pause the data acquisition. This also stops the paper advance on the Echotrac.

f) End Line
Stop the data acquisition and close the files specified by Initialisation.

g) Mark
Print a manual Mark on the Echotrac and close the line on the TTL cable. This Mark prints the time, the Fix Number from the Trisponder File, the Trisponder data, the Fix Number from the Echotrac File, and the Echotrac data.

h) Mark Repetition Time
Set the lap in approximates seconds between two automatic Marks. See Mark. The limit values are 5 to 600.

i) Report Text
This text box displays the data as they are saved, and displays some error messages.

j) Co-ordinates
This are the seabed X Y Z co-ordinates.

Note: The X and Y co-ordinates are not corrected and must be processed later to become real geographical co-ordinates.

k) Serial Status
These two text box, below the initialisation button, give the amount of bytes waiting in the two serial ports. For a real time processing these amounts must never be up to 30 for the Com1 port and 11 for the Com2 port.

l) Write
Send to the Echotrac the message written in the left text box.

m) Default Text
Send to the Echotrac a default message which contains the Line Number, the Fix Number, the date and the Time.

n) Synchronise
Synchronise all the external clocks on the computer clock. When used the computer clocks is shifted to a rounded minute. This is useful to set-up the Echotrac Clock.

2. Operation

1. Switch on the Trisponder, and the Echotrac.
2. Click on Synchronise to synchronise the clocks.
3. Click on Initialisation.
4. Select a filename in the Zedlog Save as dialog box.
5. Type the Line Number.
6. Type the Fix Number.
7. Click on Default Text to print an header on the Echotrac Paper.
8. (optional) Add a comment on the Echotrac Paper with the Write button.

9. Set the Mark Repetition Time.
10. Quit the Echotrac Stand By mode.
11. Click on Start Line to start the Line acquisition.
12. (Optional) Click on Pause to pause the Line acquisition.
13. (Optional) Click on Mark to add a manual mark.
14. Click on End Line to stop the Line acquisition.
15. Repeat steps 3 to 13 till the end of the field Survey.

For a best usage it is recommended not to switch to paper scale below 40 meters on the Echotrac, because of the depth dependent Echotrac flow data.

3. Check if everything is OK

a) Where to check

(1) *Report Text*. The report text gives useful information on the acquisition processing, It gives some additional messages. Here you can check if the data if well recorded (cf. Error Messages).

(2) *Co-ordinates.* Check here the accuracy of the values and if they often change.

(3) *Serial Status.* Check that the serial ports are not overloaded. The value must come back to zero and not exceed 30 for the first text box (Com1) and 11 for the second text box (Com2).

(4) *Beep.* The automatic marking beeps at each mark. When you stops to hear this beep, there's something wrong.

b) Error Messages

(1) *XY desynchronisation*. The flow of data from the Trisponder has been desynchronised, further data is lost, the application ends the line. This could be due to a balise switching.

(2) *Z desynchronisation*. The flow of data from the Echotrac has been desynchronised, further data is lost, the application ends the line.

(3) *Waiting for the Trisponder*. The Trisponder is not on-line.

(4) *Waiting for the Echotrac*. The Echotrac is not in acquisition mode.

(5) *Switch on the Echotrac*. The Echotrac is not on-line.

III. DEVELOPMENT INFORMATION

A. Trisponder Serial RS232

Refer to the Trisponder Manual.

1. Output
The data is coded on 30 bytes. This contains the event number, the first balise number, the first balise value, the second balise number and the second balise value. the flow is about one packet every seconds.

B. Echotrac Serial RS232

Refer to the Echotrac Manual.

1. Output
The data is coded on 11 bytes. This contains one code for unit of the measured depth and the current depth. The flow of data depends of the paper scale, and the current depth. This varies from one packet every two seconds to ten packets every seconds.

2. Input
The data sent to the Echotrac is coded in several formats. Some escape characters and some packets to set-up the Echotrac.

C. Scheduling

As the information flow from the Trisponder is constant, this is not a main problem.

Any action on the Echotrac is performed by an escape character. When received, the Echotrac stops its acquisition flow and send 02h instead of the usual 11 bytes packet. The Echotrac is in pause mode, therefore the flow of the next data must be performed as fast as possible to exit the pause mode.

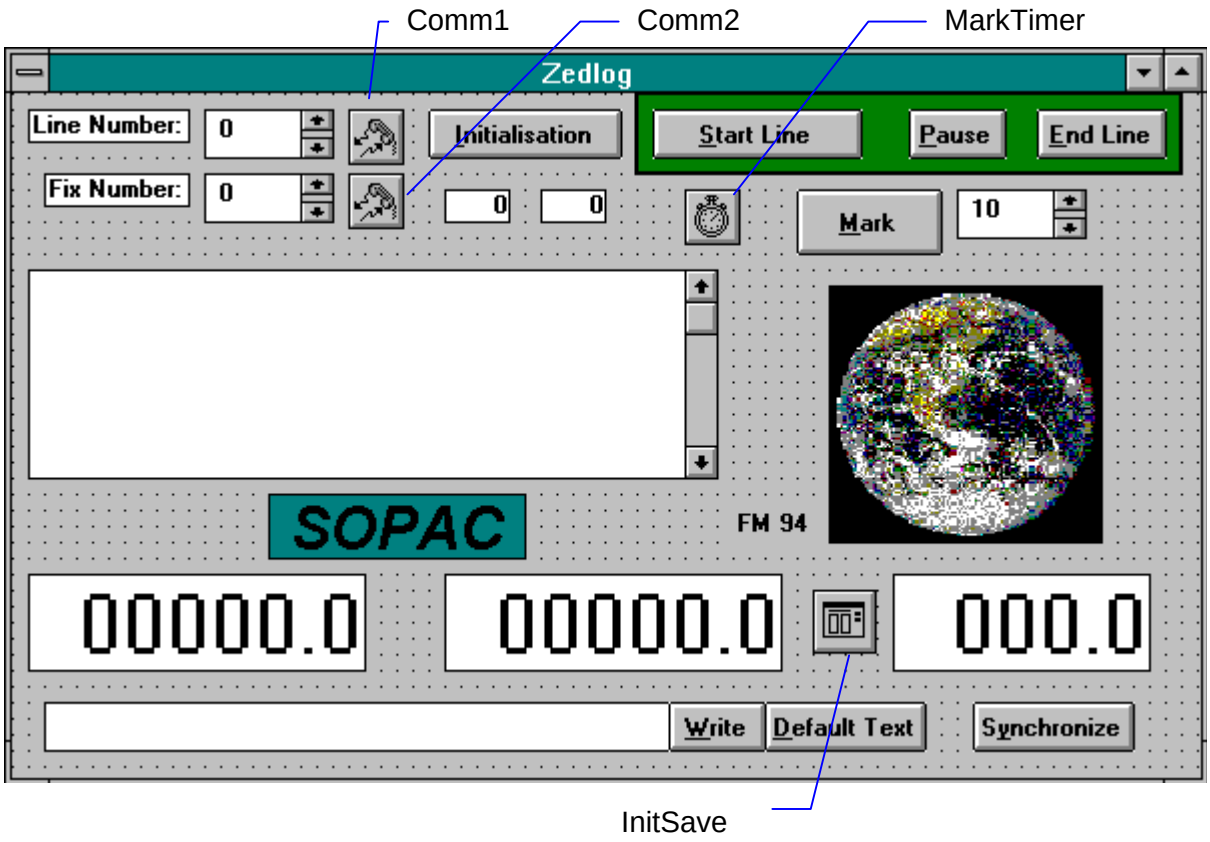
Here follows the main loop.

```
Do
   ' Retrieve all available data.
   ' Read data.
   Buffer = Comm2.Input
   If Buffer = "" Then
      If Comm2.InBufferCount = 1 Then
         Comm2.InputLen = 1
         Buffer = Comm2.Input
         If Buffer = Chr$(2) Then          'Event requested
            If EchoTracMark = True Then    'Mark requested
               .....
```

```
                End If
                If DownloadPause = True Then    'Pause Requested
                  ....
                End If
                Comm2.InputLen = 11
              Else
                If Buffer <> "" Then    'There is still some data
                  Comm2.InputLen = 10
                  Do
                  Loop Until Comm2.InBufferCount >= 10
                  Buffer = Buffer + Comm2.Input
                  Comm2.InputLen = 11
                 .....
                End If
              End If
            End If
          Else
            If Mid$(Buffer, 11, 1) <> Chr$(13) Then
              ....Z Desynchronisation
              Exit Do
            End If
            .... Save data
          End If
          ' Retrieve all available data.
          ' Read data.
          Buffer = Comm1.Input
          If Buffer <> "" Then
            If Mid$(Buffer, 29, 1) <> Chr$(13) Then
              .... XY Desynchronisation
              Exit Do
            End If
            If DownloadPause <> 2 Then  'Echotrac Papper not stopped
              ... Save data
            End If
          End If
          DoEvents
        Loop Until DownLoadStop
```

Each Event is requested by a click on the associated button. The DoEvents is essential to let the user to click on the Zedlog main window.

D. Screen Description



1. Additional Controls

a) Comm1. Handles the Com1 port. See Basic vs. Visual Basic. Settings are: 1200 bauds, no parity, 8 bits, 1 stop bit.

b) Comm2. Handles the Com2 port. See Basic vs. Visual Basic. Settings are: 9600 bauds, no parity, 8 bits, 1 stop bit. A TTL link is driven by this port with the use of the DTR pin and a specific electronic circuit.

c) InitSave. This drives the Zedlog Save As... dialog box.

d) MarkTimer. This drives the Automatic Marking. The interval is set to 100 milliseconds to be as close as possible to 10*100=1 second.

E. What's Next?

1. XY Co-ordinates
A Pop-Up Window can store the real Trisponder balises co-ordinates to allow this software to compute in real time the Trisponder Data to give real geographical co-ordinates.

2. Data savings
The data could be saved in one file, which will contains all the field survey and not only one Line. This file could be in Formatted text format, Surfer format, MapInfo format or in DXF format to be processed just after the acquisition.

3. Error Messages
The error messages could be saved in CONST types to be easily displayed, changed and translated. This allows also a supplemental debug information for the operating manual.

4. Desynchronisation
The software should be able to desynchronise the data flow and not ends the line.

5. Trisponder Balise Switching
The software should allow the balise switching and the error occurred when the two channels are set on the same balise.

6. Trisponder serial port
The software should drive the Trisponder through its serial port and allow different actions, as automatic balise switching.

7. Echotrac serial port
All the capabilities to drive the Echotrac are not implemented.

8. Real Time
By the Serial Status the software should be able to reject any data that is not recorded in real time, and warms the operator of the lost of this data.

9. Automatic Marking
Add a check box to enable or disable the automatic marking.

10. Initialisation
Creation of a Pop-Up window with filename, Line number and Fix number selection, displayed in the main window and updated after each line.

F. Bugs Registration

The author will be pleased, if you send him any bugs reported or any comments about this software. For the bugs it is important that they could be reproducible, then send as much information as possible:

1. Software version number.
2. XYZ values.
3. Error messages displayed.
4. Report Text contents.
5. Conditions of utilisation.
6. Apparatus status.
7. Windows status.

8. Last actions performed.
9. Sample of XAY and ZAT files before the bug.

Send to:

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If you let your address you will be informed of the last modifications.

In any case there is any kind of support available with this software, but I can only try to answer your queries.